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they wander out and have noted how very soon they may be separated into four distinctly different types, and following the development and behavior of these types it has seemed evident that they are entirely separate and do not intergrade or transmutate. The black chromatophore does not change its nature or divide off other cells which become different in type from the parent cell. Neither do the endothelial cells lining the vessel walls change into chromatophores or into erythroblasts, or vice versa.

From the observations on these yolk-sacs we must conclude that the four types of cells described above have developed from four different anlagen, although these anlagen were not necessarily localized groups of cells, but were diffusely scattered mesenchymal cells capable of developing into a definite product, either normal or abnormal, depending upon the nature of the developmental environment. Therefore, the four distinct mesenchymal anlagen each gives rise to a perfectly typical and distinct cell type, although all develop in, as far as is possible to judge, an identical environment, the cavity of the yolk-sac between the ectoderm and the periblastic syncytium. The differences among the four cell types produced are from the standpoint of our present knowledge in all probability due to the potential differences among the apparently similar mesenchymal cells from which they arose. The four types including endothelial cells and erythrocytes we must consider, from an embryological standpoint, as being polyphyletic in origin.

C. R. STOCKARD

WOODS HOLE, MASS.,

September 15, 1915

#### ANTHROPOLOGY AT THE SAN FRANCISCO MEETING

A SPECIAL meeting of the American Anthropological Association was held in the Museum of Greek Sculpture and Anthropology, University of California, Berkeley, August 3 to 5, 1915, in affiliation with Section H and the American Anthropological Association. In the absence of Professor A. L. Kroeber, chairman of the committee on program, Professor T. T. Waterman, vice-chairman,

presided. Although the program was a comparatively short one, the attendance at the meetings was large.

Papers of interest to anthropologists were also read before the joint meeting of the American Psychological Association and Section H; and before the Archeological Institute of America. However, the abstracts which follow will be confined entirely to the papers read before the Anthropological Association. For example, among the papers read before the Archeological Institute should be mentioned "Ancient Mexican Spindle-whorls," by Mrs. Nuttall, which was illustrated by an exhibit of two hundred specimens, as well as by reference to one of Lord Kingsborough's volumes; "Life Forms in the Pottery of the Southwest," by Mrs. Harry L. Wilson; "Aspects of Neolithic Culture of the Santa Barbara Channel Islands, California," by Hector Alliot; "Latest Work of the School of American Archeology at Quirigua, Guatemala"; and "Archeology at the Panama-California Exposition," by Edgar L. Hewett; and "The Unpublished Material in the Mayance and Southern Mexican Languages," by Wm. E. Gates.

The papers read before the American Anthropological Association included: "A Demonstration of the Skull of an Ancient San Diegan Indian Showing the Largest Coronoid Index yet Recorded" (by title), by J. C. Thompson; "Differences in Papago and Pima Coiled Basketry" (by title), by Mary Lois Kissell; "Kumana, a Primitive Corner of Japan, and Its Folk-Lore, as Studied by Mr. Minkata" (by title), by W. T. Swingle; and "The Significance of the Present Forward Movement in China," by Yamei Kin.

Abstracts of all the other papers presented follow:

*The Miwok Moieties*: E. W. GIFFORD.

The Central Sierra Miwok Indians of the Sierra Nevada Mountains of California are divided into exogamous moieties with paternal descent. Each moiety is associated through the personal names of its members with either the "water" or the "land" side of nature, this division of nature being more or less arbitrary. The object after which a person is named does not appear, as a rule, in the name itself; it does appear, however, in the connotation of the name. The connection thus existing between the moiety and a group of natural objects lends a totemic aspect to the Miwok moieties, which is supported by a myth attributing the parentage of the founders to the bear and the coyote. The moieties are practically impotent as

ceremonial factors, their chief function being the regulation of marriage.

The system of relationship contains thirty-four terms, and in certain features closely parallels the systems of the southern Siouan tribes, notably the Omaha. A striking feature is the placing of cross cousins in two generations, which results in the use for cross cousins of terms meaning son, daughter, stepmother, uncle, niece, nephew. This feature is correlated with the marriage of a woman to her father's sister's husband.

Cross cousin marriage is limited to one pair of cousins only, who use the terms meaning son and stepmother. The theory is advanced that the Miwok type of cross cousin marriage originated through the influence, upon the institution of marriage, of wife purchase and descent in the male line.

*Demonstration of a Series of Philippine Skulls from Bohol:* LUTHER PARKER.

The number of skulls under discussion is seven. These skulls were collected in a limestone burial cave on a promontory near the barrio of Tiagas in the town of Loay, Bohol Province, by the writer personally. In addition to the skulls, he also secured the lid of a coffin, some ornaments and pieces of pottery both native and Chinese. A few steel or iron spear heads and parts of blades were likewise obtained.

It is probable that the articles collected were deposited in the cave not later than A.D. 1600, since the conversion of Bohol to Christianity took place about that time. As to how much earlier the cave was used it is not possible to state, but probably not earlier than A.D. 500. Native traditions do not fix the time of these burials, but deal only with the custom of borrowing the pottery and ornaments for use in fiestas, this custom having been quite widely distributed.

Cave burial seems to have been practised quite extensively in the Bisayas and to some extent in northern Luzon among the Igorots and in the Batanes Islands. Jar burial both in caves and out was also practised in the Bisayas and in the Bobuyanans north of Luzon. Jar burial is practised among the interior tribes of north Borneo. Cave burial occurs in northeast Borneo. Jager wrote of cave burials in the Bisayas and H. Ling Roth discusses the subject quite thoroughly as relating to north Borneo.

The following table gives the measurements obtained by the writer. They are subject to correction by a more experienced observer:

Serial No.	Cephalic Ind.	Nasal Ind.	Orbital Ind.	Height	Capacity
1	77.0	53.5	88.6	138.5 mm.	1,400 cc.
2	75.2	50.0	90.0	140.5	1,420
3	93.7	Not obtainable	94.7	129.5	1,280
4	80.2	52.7	97.0	133.5	1,280
5	91.3	Not obtainable	86.4	127.5	Broken
6	93.7	57.1	84.2	120.0	Broken
7	100.	Not obtainable	87.2	132.0	1,160

As may be seen by the above tables, the skulls were not of a uniform type, but ranged from dolichocephalic to brachycephalic. This corresponds with results obtained by other observers in Malaysia and serves to confirm what is known from other sources, viz.: that the Filipinos, as all Malaysians, are very much of a mixture approximating the Japanese, Mongolian and Negritos in certain measurements.

These skulls are quite similar to living types in the neighborhood of their collection. Several of the skulls have been artificially deformed evidently by means of the "tadal" which was in use among the Milanaus of the Bintula River until recently. Jager secured deformed skulls from caves near Samar and Dr. Virchow measured and discussed them. The area of deformation seems to have included Sumatra (Rejang district), north Borneo, Ulitea Island and a part of the Bisayan group, especially Bohol and the Leyte-Samar district.

*Race in the Pacific Area with Special Reference to the Origin of the American Indians: 1. Antiquity of Occupation:* GEORGE GRANT MACCURDY.

The Pacific washes the shores of both the Old World and the New; hence the Pacific area is a large one. It is at least indirectly in connection with the birthplace of man, for it is accessible from all the great land masses. Whether the American or Asiatic portion of this area was first occupied by man is a question of wide interest. An answer to this question would be of help in locating the spot, if indeed it was a single one, from which man has spread over the face of the earth.

Physically man is a vertebrate and belongs to the great class of so-called Mammalia. We may differentiate still further and place man in one of the Families composing the order of Primates, which includes not only the Simiidae, but also the lemurs. Eocene lemurs are found in both the western (Puerco beds of North America) and eastern hemispheres. The Simiidae, however, the family most nearly approaching man in physical structure, all belong to the Old World; the gorilla and chim-

panzee, to Africa, and the orang and gibbon to the Far East. The presumption is strong, therefore, that the human race also originated in the Old World.

To the Pacific area belong the well-known fossil ape-man from Java, *Pithecanthropus erectus*, which according to the associated fauna and flora is of lower Pleistocene age.

The Selenka Trinil Expedition of 1907-08, one of whose results was to reduce the age of *Pithecanthropus* remains from Pliocene to lower Pleistocene, secured a tooth that is said by Dr. Walkoff to be definitely human. It is a third lower molar found not at the Trinil site, but in a neighboring stream bed and in deposits older (Pliocene) than those in which *Pithecanthropus* occurred. Should this prove to be the case, *Pithecanthropus* could no longer be regarded as a precursor of man; it would give us instead the cross section of a different limb of the Primate tree from the limb whose branches represent the various types of Hominidæ.

The principal event of the Australian meetings of the British Association for the Advancement of Science one year ago was the presentation of a fossilized human skull from Darling Downs on the border between New South Wales and Queensland. Unfortunately this specimen was not found *in situ*; but is in the same state of fossilization as are the remains of extinct animal species from the same locality. The latter are said to be of Pleistocene age. The "solidly fossilized" human skull (that of a youth) is evidently not of Neandertal type; nevertheless the authorities present were of the opinion that it represents an extremely primitive type. When archeologists become thoroughly awake to the possibilities of China a new chapter in the antiquity of occupation of the Pacific area will in all probability be recorded.

Passing to the American Pacific shores a good deal has already been accomplished especially in California; but the results do not point to a great antiquity of occupation. Man probably entered the Americas by way of Bering Strait after the final retreat of the last maximum glaciation. Bearing directly on this point is the discovery in 1912 by Dr. Hrdlička of vestiges of an ancient population in northeastern Asia persisting there perhaps since late Paleolithic times, and which possibly gave rise to the American Indian. This is in line with the results of the Jesup North Pacific Expedition, and future archeological discoveries may confidently be expected to support the same point of view. As a seat of human occupa-

tion, therefore, China probably antedates Mexico and Peru.

*Antiquity of Man in California from the Point of View of the Paleontologist: JOHN C. MERRIAM.*

In working over the collections of the state geological survey of California in 1894, the writer's attention was particularly attracted by a collection of mortars and other objects of human manufacture, which, according to the accompanying labels, had been found in the Pleistocene gold-bearing gravels of California. Accompanying these collections were other objects of a similar nature reported by reputable observers to have been obtained in formations not younger than Pleistocene. Although the objects in question were not unlike implements manufactured by the Indians of California within very recent time, the evidence favoring their antiquity appeared so remarkably definite that it seemed worth while attempting to secure all the facts bearing on the question of the occurrence and age in order to obtain some explanation of the evident inconsistency. Numerous inquiries among intelligent observers of good repute regarding the occurrences of human remains and relics in the auriferous gravels of California brought out a considerable amount of information as to the finds already known, and added several important occurrences to the list available. At this time there were known to the writer not less than eleven cases in which, from the point of view of the unprejudiced observer there seemed no question but that artificially fashioned objects had been found to be original constituents of Pleistocene or earlier formation of the California region.

The plan of work thus outlined was beginning to furnish small results when the organization of the department of anthropology at the University of California, through the generosity of Mrs. Phoebe A. Hearst, made it possible to carry out the whole scheme of investigation, only a small portion of which it had seemed possible for the writer to undertake individually up to that time.

While it is evident that the human race did not originate in America, its occupation of the western hemisphere has apparently covered a long period measured in years, if it does not actually extend back to an earlier geological period. At any rate, the advent of man far antedated the beginning of the American historic period and the approximate determination of the date of his arrival, whenever it may have occurred, furnishes an important field for investigation in American history.

As a field for investigation of geologically ancient types of the human race, North America has been notably barren. Even those who have been convinced that man was present on this continent before the beginning of the present geological period must concede that the evidences of his existence are much less common here than in most parts of the Old World.

Of the several widely known discoveries of human remains and relics reputed to represent a geologically ancient type of man on this continent, some of the occurrences reported from California have most persistently forced themselves on the attention of the investigator, though not always receiving general recognition as of scientific value.

It has been realized at the outset that any satisfactory conclusions in a work of this character are not to be arrived at within narrow time limits, and that no single mode of attack may be considered sufficient in itself. At the outset four lines of investigation were laid down: (1) Tracing man back from the known type to the unknown, through an investigation of the great shell mounds of the coast region, the most critical study being given to the lowest or earliest deposits. In this work we go from the known culture of the uppermost layers of the mounds back to a period in which conditions were quite different from those under which the recent Indians appear to have lived. (2) The thorough investigation of all cave deposits, whether recent or Quaternary, with particular reference to possible human occupation. (3) A careful study of these Quaternary or recent alluvial formations in which the occurrence of human remains or relics appears to be possible. This comprised a study of many Quaternary formations and the collection in them of all obtainable fossil remains. (4) A careful review of all the evidence relating to the reputed occurrence of implements or human remains in the Auriferous gravels, or other ancient deposits of a similar nature in California.

The result of investigations along the various lines followed in the original plan for the department of anthropology has shown that in a considerable number of cases fragmentary human remains or fragments of stone and bone worked by man have been found in association with Pleistocene deposits in California, but that in every case a very considerable doubt attaches to the occurrence, so that in no instance do we have in California an undoubted occurrence either of human

bones or of implements made by man in such association with Pleistocene deposits as to prove the Pleistocene age of the human relics. While remains of man are known in many localities of undoubted Pleistocene age in the Old World, and while an age in years amounting to many tens of thousands and perhaps many hundreds of thousand years can be ascribed to these remains, we have yet to show in California the relics of man's occupation dating back to more than ten or twenty thousand years.

It is possible that man coming from the Old World, the place of origin of the human race, has at various times colonized the North American continent, but was unable to secure a permanent foot-hold, and because of the brief period of his occupancy has left no ancient relics. Human history may have waited until a comparatively recent time for the occupation of the western hemisphere by man in such force as to make his conquest of the region permanent.

*Time Perspective in American Culture, a Study in Methods:* EDWARD SAPIR.

A historical science, such as cultural anthropology is, must have chronological perspective. The methods available for the determination of this perspective in aboriginal American culture are partly direct, partly inferential. The simplest type of direct evidence is that contained in the statements of early travelers and noted writers. A second type is embraced in the statements of the natives themselves. The third and most valuable type of direct chronological evidence is obtained by studying the stratigraphy of archeological remains.

The inferential evidence may be derived from the data of physical anthropology, ethnology or linguistics. Conclusions of historical value may be drawn from the persistence of a type in a certain area, and from the denseness of population. Ethnology yields a considerable number of methods for the inferring of time sequences. These may be classed into three groups as the seriation method (*e. g.*, inferences based on the relative degree of development of elements forming a natural sequence); the association method, which can be employed in a considerable number of ways (*e. g.*, by inferring chronological priority of one of two cultural elements because of its entering into a greater number of associations with other elements); and the distribution method. Linguistic evidence may be utilized for the chronology of culture partly by the study of native terms for various culture concepts, partly

by inferences based on the distribution of languages.

The ultimate task of constructing a general picture of the development of culture in America can not be undertaken without the cumulative evidence derived from all possible methods, direct and inferential, for constructing cultural time sequences.

*The Zodiacal Basis of the Snake Dance and other Hopi Ceremonials:* STANSBURY HAGAR.

The purpose of this paper is to present evidence which tends to show that the ritual of the twelve monthly festivals of the Pueblo Indians of Arizona and New Mexico is based upon zodiacal symbolism, in other words, that the features of each festival refer to the attributes of the native zodiacal signs through which the sun is passing at the time when the festival is held. This interpretation is supported: (1) by the rites directed each month towards one of the twelve white marks distributed around the circular sacred kiva or religious edifice at Zuni, as described by the late Frank Hamilton Cushing; (2) by the association of the sun and star gods as the two principal actors in the winter solstice ceremony at Walpi; (3) by the determination of the moment of beginning the principal ritual of the Manzrau and other festivals at Walpi by observation of the zodiacal constellation in opposition to the sun at the moment of midnight or approximately then; (4) by the repetition of each festival in a minor manner at a date six months distant from the principal performance, the minor festival being directed toward the zodiacal sign in opposition to the sun through the sign. But more impressive than this internal evidence from the writer's viewpoint is the fact that the features of all twelve of the Pueblo festivals *in sequence* correspond with the features of the festival celebrated at the same time amongst the ancient Mexicans and the Maya of Yucatan; and the writer has established at least to his own satisfaction, in papers published in the *American Anthropologist* and the publications of the International Congress of Americanists, that this Mexican and Maya ritual was based upon this same zodiacal symbolism. Such a sequence of symbolism can not be created by chance nor constituted by inauguration. It is revealed in star charts and constellation symbols in the codices, in mural paintings and in the design of sacred cities as well as in the ritual referred to; and if zodiacal in Mexico, the same sequence of symbolism can hardly be otherwise than zodiacal amongst the Pueblos.

Probably in no religion did astronomy play a more important part than in that of ancient America from Peru to Arizona, and this zodiacal symbolism gives us the key to its significance. But in all this vast area only amongst the Pueblos can the astronomic ritual still be seen.

The Snake Dance, to-day the most famous ritual of the American Indian, is but a subordinate episode of the festival which should be known as that of the mountain lion held when the sun is passing through the zodiacal constellation known to the Pueblos, Mexicans and Maya by the name of that animal. It is our sign Leo, the lion. And in the following month the women's Maize Festival of the Pueblos honors the Maize Goddess as in Mexico, Yucatan and Peru when the sun is passing through the sign of the Maize Mother. She is our Virgo, the celestial mother of cereals.

*The Octopus Motive in Ancient Chiriquian Art:*

GEORGE GRANT MACCUDY.

In the ancient pottery of Chiriqui, one soon learns to associate a given motive with a given paste, slip, quality of modeling and the character and number of the colors employed as well as the method of their application. Thus we find the plastic armadillo dominating the great group which might appropriately bear that name; the incised serpent goes with a distinctive group of black ware; the plastic fish in the guise of tripod supports runs through another group; while the painted alligator is supreme in two closely related groups of painted ware. The most puzzling designs were on the so-called lost color ware. A key to their meaning recently came to light in the shape of a more realistic rendering of the motive than had been known hitherto. The design, called to my attention by Professor M. H. Saville, and recently published by me, represents an octopus.

A further study tends not only to confirm what was said in my last note, but also to emphasize the importance of this newly discovered motive as the one distinctive feature of lost color symbolism in ancient Chiriquian art.

On a reexamination of the lost color ware, the octopus design is found to appear unmistakably under one guise or another on perhaps nine tenths of all the lost color vases hitherto published; a cursory study of the large duplicate series in the Yale Museum shows that at least as large a percentage holds true of unpublished specimens. If a new name were needed for this large group, *Octopus* ware would thus be most appropriate.

*Eugenics and its Natural Limitations in Man:*

ALEŠ HRDLÍČKA (not present).

*Human Eugenics* may be defined as the "science of improving the human stock." It stands in many respects on quite a different footing from eugenics of organisms other than man. The term is relatively new; it relates to a seemingly new and most promising as well as timely scope of activities; and due to its appeals to popular imagination, and in common with other newly appearing branches of the science of man in the past, it has been and is now much sinned against. It has been permitted and even used to arouse hopes which at best can not be realized except at a very slow pace and in the course of great length of time.

To improve man it will self-evidently be necessary first to know thoroughly: (1) the stock to be worked upon; and (2) what constitutes improvements in the same; then the worker will be confronted with a most important problem, namely, how to effect the improvements, and how to make them permanent or even progressive, and thoroughly wholesome.

The knowledge of the stock implies perfect anatomical, anthropological, physiological, pathological and especially chemical understanding. How far we are in all these respects from the goal is well appreciated by the more advanced students in these different branches of learning.

As to what would constitute improvement in the human stock a general agreement will probably be reached on the following:

- (1) Universal bettering of health;
- (2) Fortification against infectious or contagious diseases or immunization;
- (3) Elimination of hereditary defects and untoward predispositions;
- (4) Increase in nervous power and resistance;
- (5) Increase in sensorial efficiency;
- (6) Progressive improvement in mentality; and
- (7) A general, fixed harmony of all results, that would strengthen and not adversely interfere with the vital functions of the body.

Reflections on the above with our actual knowledge of humanity will readily show the many and great limitations that confront the "science of improving man." We know at best only superficially what we deal with even in the case of our own person; we never learn the whole inheritance of any man or woman; we deal, not with simple mathematical propositions, but with intricate combinations of qualities and quantities in each subject; in a great majority of cases we know not as yet how to remove or compensate for a given defect, or how to strengthen permanently

and especially create a desirable quality, or how to prevent or cause the transmission of tendencies or qualities. And we have and shall probably continue to have only insignificant control of subjects in the vital matters of mating, living, environment.

Viewed thus very soberly, the new science in its application to man loses much of its fancied luster; if it succeeds in becoming established as a separate branch of learning, as it has in reference to lower forms, it will be welcomed as a helping sister, confronted with hard work, modest in the appreciation of the difficulties which lie before it and grateful for all past and future assistance. After novelty wears off, it will follow patiently in the slow laborious footpath started upon long ago by the physician and surgeon and then by the students of mankind in general. But it is still somewhat questionable if human eugenics really can prove itself to possess a sufficiency of distinctive attributes to proceed as a separate branch of science.

*Migration and Culture:* ROBERT H. LOWIE.

Migration and culture are closely interwoven, indeed migration is often solely an inference from cultural facts, especially of a linguistic character. In point of clearly demonstrable migrations the two divisions of the Pacific area differ widely, those of Oceania being incomparably greater than those in western America. Accordingly there has also been a wider diffusion of cultural traits in Oceania. The important problem whether Polynesian seafarers ever reached America remains unsolved. Van Hornbostel has furnished good evidence from the point of view of theoretical music, but this evidence stands alone. There certainly has been no far-reaching influence of Oceania on New World culture.

Ethnologists are beginning to realize that the problem is not solved when similarities in culture are explained by transmission due to contacts. We must learn what particular features are adopted by the borrowing people; whether the borrowed elements are adopted mechanically or are assimilated to the preexisting culture of the people; and a host of other circumstances must be ascertained if our knowledge of cultural diffusion is to become more than superficial. The questions here indicated are among the most promising in the range of ethnology; and Dr. Rivers in England, and a number of American investigators, have made a fair beginning in attacking them.

GEORGE GRANT MACCURDY,

*Secretary*